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THE EFFECT OF SPECIFIC PRE SEASON TRAINING PACKAGE ON SELECTED PHYSICAL FITNESS VARIABLES.

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Abstract: The purpose of the study was to find out the effect of a pre-season training package on selected physical fitness variables of Volleyball players. In total 100 numbers of students were taken as subjects and were divided equally (50 each) into two groups namely Experimental and Control groups. Pre tests on physical fitness variable was conducted prior to pre season training package to the experimental group and post test was made after a 12 week treatment and comparisons were made between and within the groups were statistical analyzed by using Analysis of Variance prescribed in Mixed Model Least-Squares and Maximum Likelihood Computer Program Pc-2 as programmed by Walter R. Harvey.

Key words: *Pre-season Training Package, Muscular Strength, Agility, Explosive power, Speed and Cardiovascular Endurance*

Introduction:

The year around Training programmes of players are divided into three phases namely pre-season, in-season and off-season [1]. Pre-season training phase is the period eight to ten weeks prior to competition in which training programmes are designed to increase the capacities of the energy systems to a maximum extent that are predominant when performing a specific event. The pre-season training is the base creation for better performance in the competition [2]. The various performance factors are developed sequentially in this period. This programme should lead to a gradual improvement in physical fitness with the peak being reached during the season [3]. Hilsendager *et.al.* (1969) in their study, 83 male University subjects were divided into five groups with one group each participating in exercises designed to improve agility, speed, strength and the remaining group participating in lectures [4]. Thirty one tests were administered before and after participation in the 6 week programme, and the data were analyzed by the analysis of covariance technique. The group participating

in agility exercises demonstrated statistically significant superiority over one or more of the other groups on four of the seven agility tests. The only other groups which demonstrated superiority on any of the agility tests were the speed groups, thereby leading to the conclusion that agility can best be developed in programmes designed specifically for that purpose and consequently that a unique factor of agility does exist.

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Methodology:

The Subjects: Total 100 (One hundred) numbers of Boys were taken as subjects of the study. All the subjects were physical education professional students belonging to C.P.Ed. and B.P.Ed. Classes of Baliapal College of Physical Education. Their age group was ranging from 19 to 27 years.

Sampling: On the basis of random sampling, conducted in the classes students (volleyball players participated in college intramural competitions) were selected for the study. They were assigned into two equal groups numbering 50 in each group. The groups were categorized as;

1. Experimental Group and 2. Control Group.

Research Design: The investigator adopted experimental method of research to ascertain the effect of a specific preseason training package on physical fitness variables of volleyball players of college level.

Reliability of Data: The reliability of data was measured by ensuring instrument precision, tester and subjects' competency.

Dependant Variables: (Physical fitness Variables)

1. Muscular Strength, 2. Agility, 3. Explosive power, 4. Speed and 5. Cardiovascular Endurance. Measurements above six variables were taken during pre and post tests (after 4 weeks, 8 weeks and 12 weeks) and standard methods were followed to procure the data.

Independent Variables: The training stimuli i.e., Specific Pre-Season Training Package was considered here as the Independent variable.

Instrumentations and Administration of Dependant Variables:

1. Muscular Strength: (Pull-ups)

Purpose: To measure arm and shoulder strength.

Procedure: The bar is adjusted to such a height that the subject hang free off the floor. The subject should grasp firmly the bar with his palms facing away from his body. The subject should then, raise his body until his chin is over the bar and then lowers it again to the starting position with his arms fully extended.

Reliability: A 'r' 0.99 was found for this test when scores were recorded on separate days using students those are familiar with the exercises.

Objectives: An 'r' 0.99 was reported.

Validity: Acceptable face validity has been reported for this test.

Scoring: One point is scored each time when the subject completes a pull-up. Part scores is not counted and only one trial is permitted unless it is obvious that the subject did not have a rare chance on his first trial.

2. Agility: (SEMO Agility test)

Purpose: To measure agility level of the subjects during forward, sideward and backward maneuvering movements. The test was suitable for both the sexes.

Facilities and Equipment: A stopwatch, four plastic cones (9''x9'') base having 12'' in height, smooth area measuring 12'x19'.

Reliability: A 'r' 0.97 was reported through test and retest process.

Objectives: A 'r' 0.88 was found for this test when scores were recorded on trials one and two

Validity: A 'r'' of 0.63 was found when SEMO test was correlated with AAHPER.

Scoring: each subject is given two trials and the time of each trial is noted accurately up to 0.1 second. The lessen value of the time out of the two trials was the score of the subject.

3. Explosive power:

The Standing Broad Jump is a common and easy to administer test of explosive power.

- **Purpose:** to measure the explosive power.
- **Procedure:** The athlete stands behind a line marked on the ground with feet slightly apart. A two foot take-off and landing is used, with swinging of the arms and bending of the knees to provide forward drive. The subject attempts to jump as far as possible, landing on both feet without falling backwards. Three attempts are allowed.
- **Scoring:** The measurement is taken from take-off line to the nearest point of contact on the landing (back of the heels). Record the longest distance jumped, the best of three attempts.

4. Speed (50mts Dash):

- **Purpose:** To measure speed.
- **Procedure:** The subject stands behind the line (starting). After the signal, the subject accelerates and cross the line with maximum possible speed.
- **Scoring:** The time keeper stands at finishing line and when the subject starts from starting line he makes the stopwatch on and after a distance of 50 meters at the finishing point he stops the watch when the subject crosses. Subjects are not allowed to wear spikes and the floor should not be slippery.

5. Cardiovascular Endurance:

- *Purpose: The Harvard Step test has been developed for the purpose of measuring cardiovascular endurance relating to circulo-respiratory fitness Though the method is now used rarely, the researcher used this particular tool to measure this variable (cardiovascular endurance) as alternative tool was unavailable. This test is based on the fact that the speed at which one recovers from hard exercise is an indicator of his circulo-respiratory fitness level.*
- *Facilities and Equipment: 20 inch height bench and a stopwatch.*
- *Procedure and Test Administration: The subject steps up and down on the 40' bench average 30 times per minute for 3 minutes. At the end of the test the subject sits immediately and pulse rate is counted and recorded with an interval of 30 seconds in a minute.*
- *Validity: players were found to score considerable higher than non players and their scores improved with training and decreased after training. The test was having supportive face validity.*
- *Scoring: With the following formula the score (index) of the test was calculated.*
[Duration of Exercise in Seconds] X 100

Index= -----

5.5 x [Pulse count 1 to 1.5 minutes]

ADMINISTRATION OF THE TEST:

Construction of Specific Pre-Season Training Package

A training package, includes conditioning exercises , physical activities , drills and tactical maneuvers which was designed systematically and scientifically . The package was a comprehensive and thorough one which was supposed to improve the physical fitness. Based on the literature available and the opinion of the experts the following training details were determined for the specific training package .

Periodisation	:Double periodisation
Duration of training period	:12 weeks
Number of days per week	:6 days
Number of sessions per day	:2 sessions
Duration of session	:Morning – 120 minutes ,Evening - 120 minutes

The load pattern, the volume and intensity of training for physical fitness, technique and tactics, means and methods to be followed and meso-cycle plan were summarized in tables 2 to 6.

LOAD PROGRESSION

The principle of progression of load was adopted. The load dynamics was arranged in such a way that the volume increased initially and intensity increased in the end. The load during the micro cycle was high and medium alternatively and high during the last two days before a complete rest day .

TRAINING MEANS AND METHODS

The following means and methods were adopted for the development of various performance factors during the training .

Speed	Interval training and hollow sprints
Strength	Weight training and Plyometric Training
Agility	Calisthenics
Flexibility	Stretching exercises
Endurance	Circuit training, Fartlek training, Cross country
Explosive power	Plyometric training.

The statistical analysis of the data collected were being analyzed by using Analysis of Variance prescribed in Mixed Model Least-Squares and Maximum Likelihood Computer Program Pc-2 as programmed by Walter R. Harvey. The obtained results were tested at 0.05 level of confidence, since it was considered adequate for the purpose of the study.

Using descriptive analysis the status of criterion measures such as Agility, Muscular Strength, Explosive power, Speed, and Cardiovascular Endurance of experimental and control groups were assessed before and after the treatment. Further the final means of the groups were adjusted by taking into consideration of the initial means of the groups. The data as statistical analyzed are being presented below.

TABLE 1. LEAST-SQUARES MEAN AND STANDARD ERROR OF PARAMETERS ON PHYSICAL FITNESS THROUGH 12 WEEKS PERIOD IN EXPERIMENTAL GROUP OF VOLLEYBALL PLAYERS (N-50)

VARIABLES	PRE-TEST	POST-TEST (4 WEEKS)	POST-TEST (8WEEKS)	POST-TEST (12 WEEKS)
Agility CD Value-0.2	10.97±0.07 ^a	10.65±0.07 ^b	10.33±0.07 ^c	9.50±0.07 ^d
Muscular Strength CD Value-0.49	10.14±0.17 ^a	10.02±0.17 ^a	12.38±0.17 ^b	15.54±0.17 ^c
Explosive power CD Value- 1.38	83.60±0.49 ^a	88.10±0.49 ^b	90.46±0.49 ^c	95.52±0.49 ^d
Speed CD Value-0.2	7.74±0.07 ^a	7.61±0.07 ^{ab}	7.54±0.07 ^b	7.33±0.07 ^c
Cardiovascular Endurance CD Value-1.95	85.07±0.69 ^a	85.48±0.69 ^a	85.90±0.69 ^a	89.68±0.69 ^b

Different super scripts differ significantly ($p \leq 0.05$) in columns

The table 1 indicated the least-squares mean and standard error of parameters on physical fitness through 12 weeks period in experimental group of volleyball players. The CD (Critical Difference) value of all independent variables were calculated and cited along with variables. The least squares mean obtained for all the variables in their pretest and posttests (4wk., 8wk., & 12wk.) were being calculated and differences found were reported.

In case of **Agility** variable it was observed that pretest least squares mean was 10.97 where as posttest least squares means for 4 week, 8 week, and 12 week were 10.65, 10.33 and 9.50 respectively (Fig. 1). Significant differences existed at .05 level of confidence between pretest and posttests of 4 weeks, 8 weeks, and 12 weeks based on obtained CD value of Agility.

The pretest least squares mean of **Muscular Strength** variable was 10.14 where as posttest least squares means for 4 week, 8 week, and 12 week were 10.02, 12.38 and 15.54 respectively (Fig. 2). Significant differences existed at .05 level of confidence between pretest and posttests of 8 weeks, and 12 weeks based on obtained CD value of muscular strength. But it was observed that least squares mean difference between pretest and posttest of 4 week duration was not significant at .05 level of confidence.

In **Explosive Power**, it was observed that pretest least squares mean was 83.60 where as posttest least squares means for 4 week, 8 week, and 12 week were 88.10, 90.46 and 95.52 respectively (Fig 3). Significant difference existed at .05 level of confidence between pretest and posttests of 4 weeks, 8 weeks, and 12 weeks based on obtained CD value of explosive power variable.

The pretest least squares mean of **Speed** variable was 7.74 where as posttest least squares means for 4 week, 8 week, and 12 week were 7.61, 7.54 and 7.33 respectively (Fig. 4). Significant differences existed at .05 level of confidence between pretest and posttests of 8 weeks, and 12 weeks based on obtained CD value of speed. But it was observed that least squares mean difference between pretest and posttest of 4 weeks and least squares mean difference between posttest of 4 weeks and posttest of 8 weeks were not significant at .05 level of confidence.

The pretest least squares mean of **Cardio Vascular Endurance** variable was 85.07 where as posttest least squares means for 4 week, 8 week, and 12 week were 85.48, 85.90 and 89.68 respectively (Fig. 5). Significant differences existed at .05 level of confidence between pretest and posttests of 12 weeks based on obtained CD value of speed. But it was observed that least squares mean difference between pretest and posttest of 4 weeks 8 weeks were not significant at .05 level of confidence.

FIG. 1 (LEAST-SQUARES MEAN DIFFERENCES BETWEEN PRETEST AND POSTTESTS ON AGILITY OF EXPERIMENTAL GROUP)

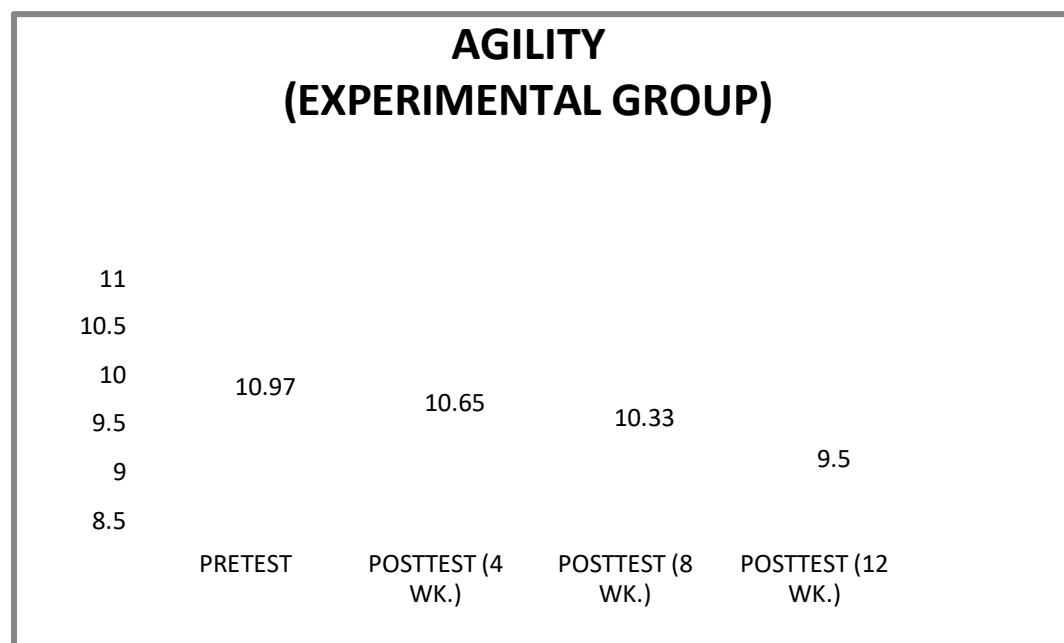


FIG. 2 (LEAST-SQUARES MEAN DIFFERENCES BETWEEN PRETEST AND POSTTESTS ON MUSCULAR STRENGTH OF EXPERIMENTAL GROUP)

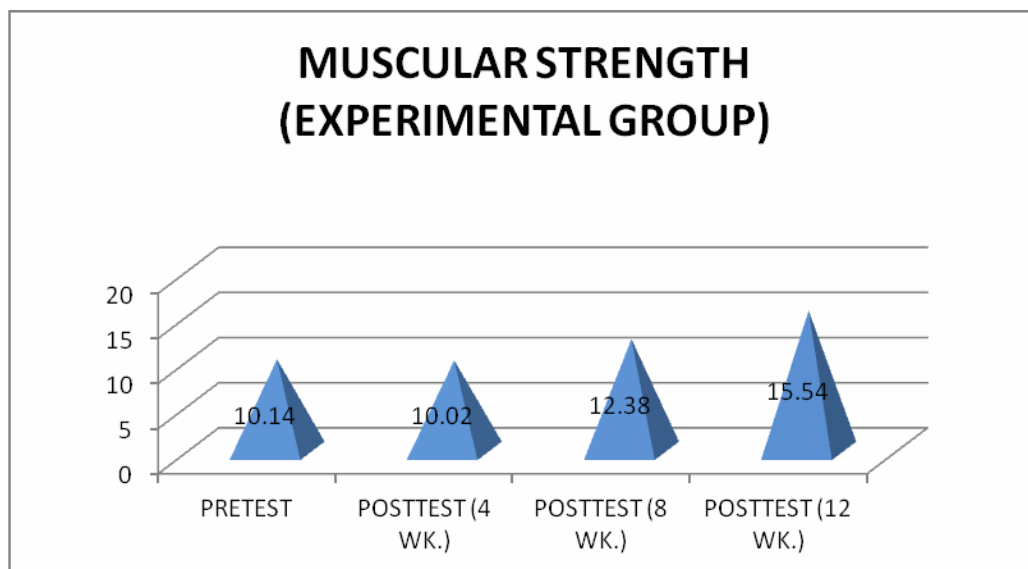


FIG. 3 (LEAST-SQUARES MEAN DIFFERENCES BETWEEN PRETEST AND POSTTESTS ON EXPLOSIVE POWER OF EXPERIMENTAL GROUP)

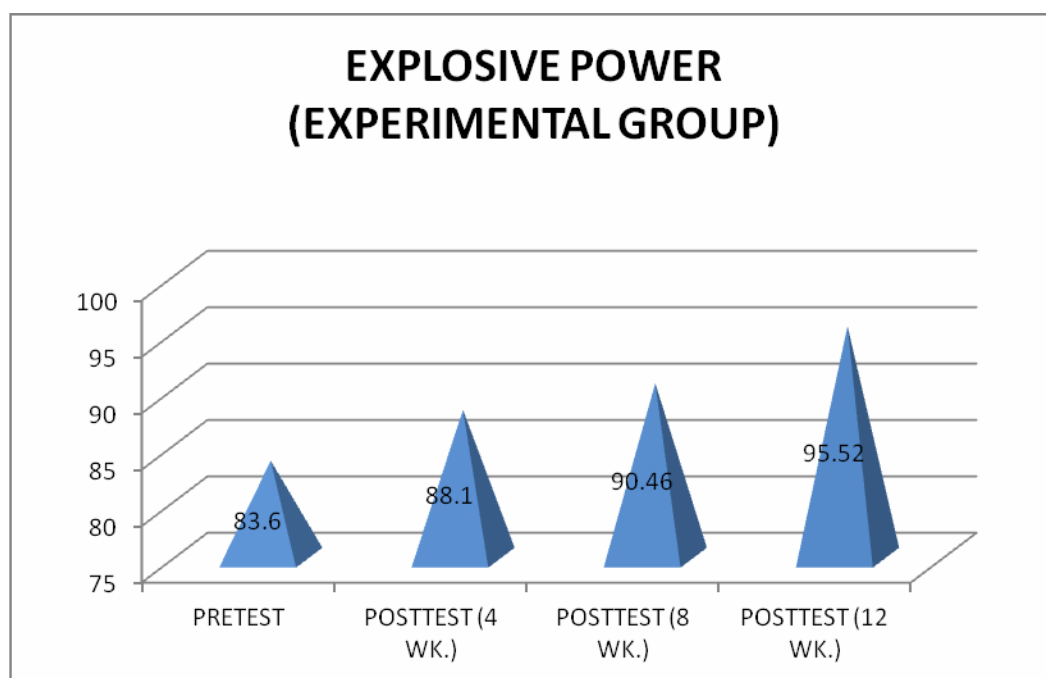


FIG. 4 (LEAST-SQUARES MEAN DIFFERENCES BETWEEN PRETEST AND POSTTESTS ON SPEED OF EXPERIMENTAL GROUP)

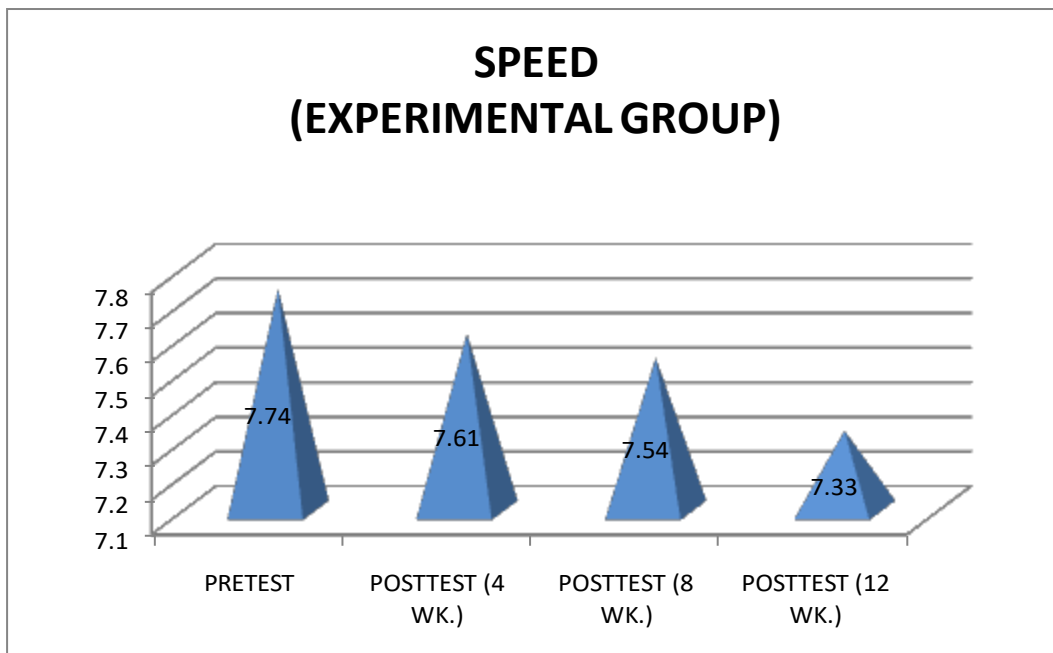


FIG. 5 (LEAST-SQUARES MEAN DIFFERENCES BETWEEN PRETEST AND POSTTESTS ON CARDIOVASCULAR ENDURANCE OF EXPERIMENTAL GROUP)

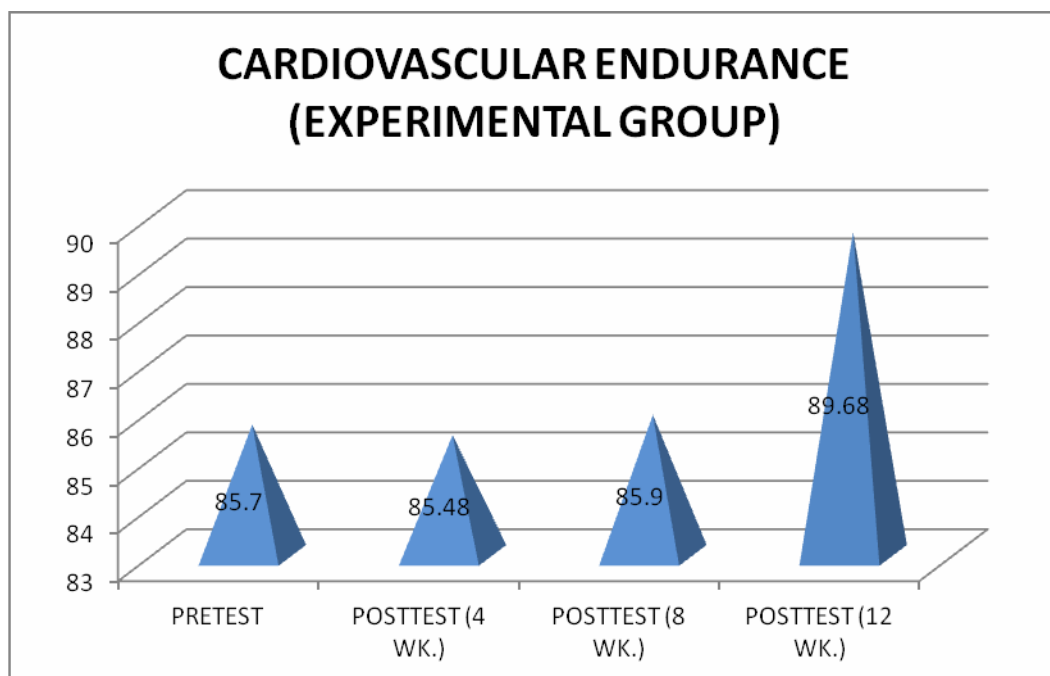


TABLE 2 LEAST SQUARES MEAN AND STANDARD ERROR OF PRE AND POST TESTS OF CONTROL GROUP ON PARAMETERS PERTAINING TO SELECTED PHYSICAL FITNESS VARIABLES OF VOLLEYBALL PLAYERS (N=50)

VARIABLES	Pre-Test	Post-Test (12 weeks)	calculated „t“ value
Agility	10.33±0.08	10.41±0.08	0.73
Muscular Strength	10.04±0.17	10.30±0.08	1.08
Explosive power	83.40±0.50	83.68±0.50	0.38
Speed	7.79±0.07	7.71±0.07	0.8
Cardiovascular Endurance	86.61±0.55	86.58±0.55	0.04

The table 2 indicated the least-squares mean and standard error of parameters on physical fitness through 12 weeks period in experimental group of volleyball players. The „t“ value of all independent variables were calculated and cited along with variables. The least squares mean obtained for all the variables in their pretest and posttests (12wk.) were being calculated and differences found were reported. No significant difference exist between Pre-test and Post-test on all variables at ($p \leq .05$).

TABLE 3. LEAST-SQUARES ANALYSIS OF VARIANCE OF SPECIFIC PRE-SEASON TRAINING PACKAGE GROUP IN DEPENDANT VARIABLES (EXPERIMENTAL GROUP)

Variables	Source of Variation	df	Sum of Squares	Mean Squares	F
Agility	Treatment	3	59.75	19.92	77.8*
	Residual	196	50.178	.256	
Muscular Strength	Treatment	3	840.22	280.07	183.47*
	Residual	196	299.2	1.526	
Explosive power	Treatment	3	3695.32	1231.77	103.73*
	Residual	196	2327.4	11.87	
Speed	Treatment	3	4.36	1.45	5.88*
	Residual	196	48.5	.247	
Cardiovascular Endurance	Treatment	3	678.85	226.28	9.53*
	Residual	196	4655.43	23.75	

*SIGNIFICANT AT 0.05 LEVEL

Table value for df 3 and 196 was 2.60

The observed „F“ values (Table- 3) of the experimental group were 77.8 (Agility), 1847 (Muscular Strength), 103.73 (Explosive power), 5.88 (Speed), 9.53(Cardiovascular Endurance) and were significant at 0.05 level of confidence. Since the observed „F“ values were greater than the table „F“ value for the df 3/196 i.e., 2.60, it was concluded that the changes occurred across the treatment period was statistically significant.

TABLE 4- LEAST-SQUARES ANALYSIS OF VARIANCE OF DEPENDANT VARIABLES (CONTROL GROUP)

Variables	Source of Variation	DF	Sum of Squares	Mean Squares	F
Agility	Treatment	1	.15	.15	.51
	Residual	98	28.68	.2926	
Muscular Strength	Treatment	1	1.69	1.69	1.15
	Residual	98	144.42	1.47	
Explosive power	Treatment	1	1.96	1.96	.16
	Residual	98	1224.88	12.49	
Speed	Treatment	1	.15	.15	.57
	Residual	98	24.97	.254	
Cardiovascular Endurance	Treatment	1	.014	.014	.001
	Residual	98	1479.87	15.1	

Table value for df 1 and 98 was 3.92

The observed „F“ values (Table- 4) of the control group on physical fitness variables were .51 (Agility), 1.15 (Muscular Strength), .16 (Explosive power), .57 (Speed), .001 (Cardiovascular Endurance) and were not significant at 0.05 level of confidence. Since the observed „F“ values were less than the table „F“ value for the df 1/98 i.e., 3.92, it was concluded that the changes occurred across the 12 week period was statistically not significant.

CONCLUSION: Basing on the results obtained in the present study, the following conclusions were being made.

1. The specific pre season training programme for 4 week/ 8 week or 12 weeks duration enhanced the agility of the players significantly. But 12 week participation in the specific pre-season training package had marked maximum gain on the agility.
2. The specific pre season training programme for 8 week and 12 weeks duration enhanced the Muscular Strength of the players significantly. The 12 week participation in the specific pre-season training package had marked maximum gain on the Muscular Strength. Training programme for 4 week duration was not adequate to develop muscular strength of volleyball players.
3. The specific pre season training programme for 4 week, 8 week and 12 weeks duration enhanced the Explosive power of the players significantly. The 12 week participation in the specific pre-season training package had marked maximum gain on the Explosive power.
4. The specific pre season training programme for 8 week and 12 weeks duration for volleyball players were effective and it enhanced the Speed of the players significantly. The 12 week participation in the specific pre-season training package had marked maximum gain on the speed. Training programme for 4 week duration was not adequate to develop speed of the volleyball players.
5. The specific pre season training programme for 12 weeks duration for volleyball players was effective and it enhances the Cardio Vascular Endurance of the players significantly. The training programme for 4 week and 8 week duration were not effective for enhancing the cardio vascular endurance of the volleyball players.

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